



International Civil Aviation Organization

ASECNA Workshop on ADSB Dakar, Senegal 22-23 July 2014

AFI Regional Requirements for Surveillance Systems in support to ATM

*Presented by François-Xavier SALAMBANGA, ICAO Regional Officer Communication,
Navigation & Surveillance (CNS)*

OUTLINE



- **Homogeneous ATM Areas in AFI Region**

- **Global and Regional Requirements**
 - ✓ **GANP**
 - ✓ **AFI RAN Recommendations**
 - ✓ **APIRG Conclusions**
 - ✓ **AFI Surveillance Strategy**
 - ✓ **Outcome of SAT Meetings**

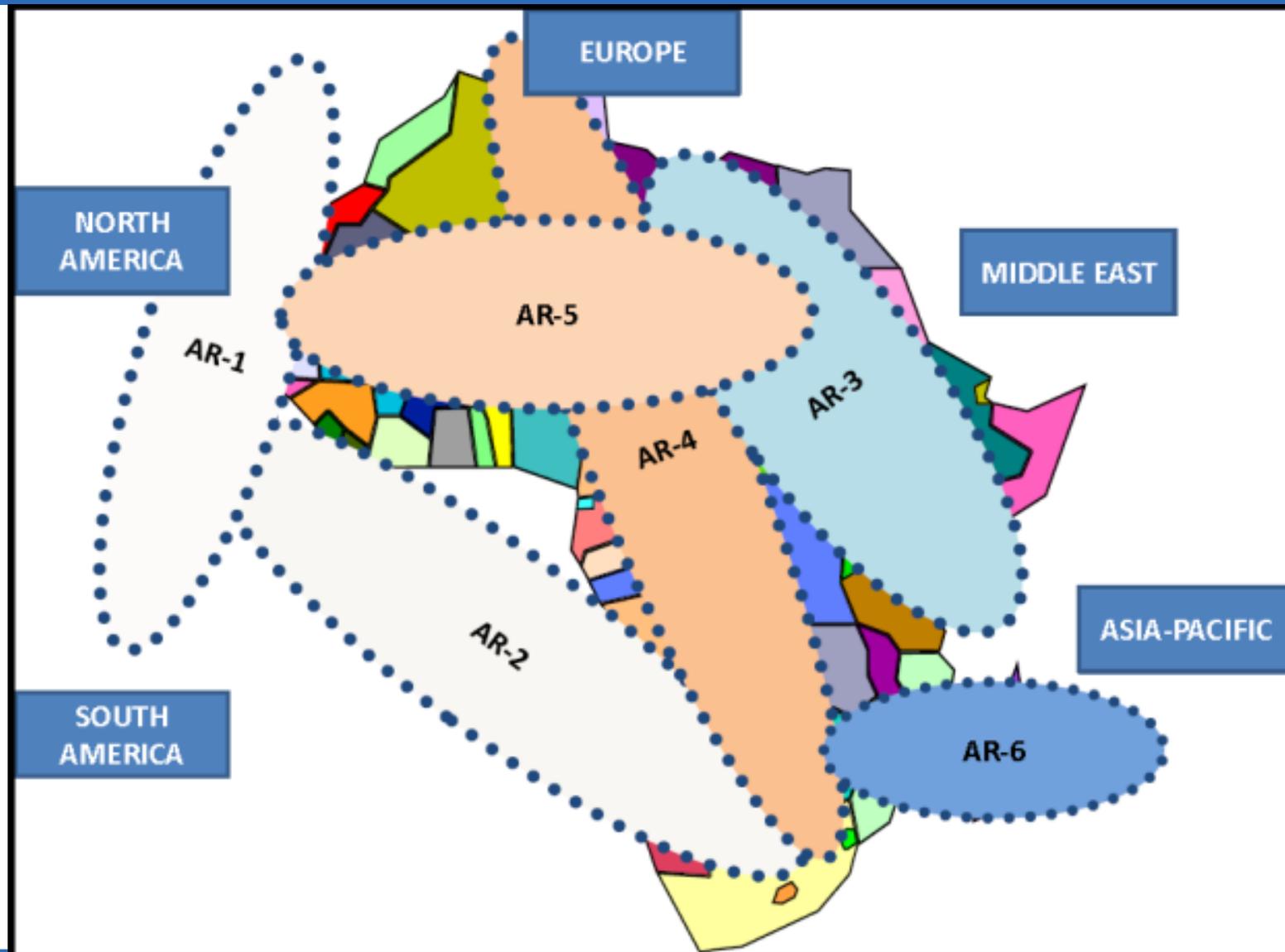
- **Objective of this Mission**

HOMOGENEOUS ATM AREAS IN THE ICAO AFI REGION



Areas of routing (AR)	Traffic Flows	Areas involved	Type of area covered	Remarks
Africa-Indian Ocean (AFI) Region				
AR1	Europe — South America (EUR/SAM) (oceanic)	Atlantico 1, Canarias, Casablanca, Dakar Oceanic, Recife, Sal Oceanic	Oceanic en route low density in southern part and oceanic high density in northern part	Major traffic flow EUR/SAM
AR2	Atlantic Ocean interface between the AFI, NAT and SAM Regions	Accra, Dakar, Johannesburg, Luanda, Sal	Oceanic en route low density	Homogeneous ATM area AFI/NAT/SAM
AR3	Europe — Eastern Africa routes including the area of the Indian Ocean	Addis Ababa, Antananarivo, Asmara, Cairo, Dar es-Salaam, Entebbe, Khartoum, Mauritius, Mogadishu, Nairobi, Seychelles, Tripoli	Continental en route/ oceanic low density	Major traffic flow AFI/EUR
AR4	Europe to Southern Africa	Algiers, Beira, Brazzaville, Cape Town, Gaborone, Harare, Johannesburg, Kano, Kinshasa, Lilongwe, Luanda, Lusaka, N'Djamena, Niamey, Tripoli, Tunis, Windhoek	Continental en route low density	Major traffic flow AFI/EUR
AR5	Continental Western Africa including coastal areas	Accra, Addis Ababa, Brazzaville, Dakar, Dar-es-Salaam, Entebbe, Kano, Khartoum, Kinshasa, Nairobi, Ndjamena, Niamey, Roberts	Continental/oceanic low density	Homogeneous area AFI (this is a growing traffic, developing into major traffic flow)
AR6	Trans-Indian	Antananarivo, Bombay 1, Johannesburg Male 1, Mauritius, Melbourne 1, Seychelles	Oceanic high density	Homogeneous ATM area AFI/ASIA

ATM HOMOGENEOUS AREAS IN THE ICAO AFI REGION





Global and Regional Requirements

- **The ICAO GANP as a catalyst for change**
 - **Provides a global interoperability framework;**
 - **Allows adaptation to efficiently meet regional and local needs.**
- **The AFI ANP as a Regional implementation tool**
 - **Develops/updates regional surveillance planning and Implementation strategy;**
 - **Coordinate/harmonize Regional systems implementation and operation processes.**

Global and Regional Requirements: AFI RAN Recommendations in Relation with the GANP



- **Developed ATM Performance Objectives:**
 - ✓ CHECKLIST FOR IMPLEMENTATION OF THE NEW ICAO FLIGHT PLAN (FPL) FORM
 - ✓ OPERATIONAL SAFETY ASSESSMENT METHODOLOGY

- **Established the Tactical Action Group (TAG)**
 - ✓ CARRY OUT AN ONGOING SAFETY ASSESSMENT OF OPERATION ON COMMUNICATIONS PROBLEMS, NAVIGATION AND SURVEILLANCE ISSUES
 - ✓ COORDINATE ACTIVITIES AND PLAN FUTURE GOALS



Conclusions / Decisions

- **APIRG Conclusion 16/27 : AFI Surveillance strategy**
 - ✓ Develop/Update AFI Surveillance planning and implementation strategy;
 - ✓ Coordinate/Harmonize AFI surveillance implementation projects to ensure seamless surveillance operation (**Systems Interoperability**);
- **APIRG Conclusion 16/31: Collective approach for the Management of CNS/ATM elements**
 - ✓ ANSPs to speak in a single voice when implementing CNS/ATM systems for service level agreements with ATN service providers, system availability, etc

Global and Regional Requirements: APIRG

Conclusions / Decisions



- **APIRG Conclusion 17/25: Implementation of CPDLC**
 - ✓ **That, States implement CPDLC procedures for en-route operations in their managed oceanic and remote continental airspace.**
- **APIRG Conclusion 17/31: Implementation of ADS-C**
 - ✓ **That, States implement ADS-C Procedures for en-route operations in their managed oceanic and remote continental airspace.**

Global and Regional Requirements: APIRG Conclusions / Decisions



■ APIRG 18

- ✓ Amended the AFI Surveillance Implementation Strategy (Conclusion 18/34);
- ✓ Encouraged neighboring States/ACCs to exchange surveillance data to enhance aeronautical surveillance (Interoperability, seamless operation);
- ✓ Recognized the need for the AFI Region to implement a monitoring system to address reported problems (Collaborative Decision Making)

Global and Regional Requirements: Summary of AFI Surveillance Strategy



- **Surveillance technologies considered in AFI strategy, to meet present and future ATM :**
 - ✓ **Voice Reporting and Flight Data processing;**
 - ✓ **Primary Radar (PSR-Non-Cooperative Target);**
 - ✓ **Secondary Surveillance Radar (SSR-Independent Cooperative Target);**

Global and Regional Requirements: Summary of AFI Surveillance Strategy



- **Surveillance technologies considered in AFI strategy, to meet present and future ATM:**
 - ✓ **Wide Area Multilateration (WAM-SSR-Independent Cooperative Target);**
 - ✓ **Automatic Dependent Surveillance-Contract (ADS-C-Dependant cooperative Target);**
 - ✓ **Automatic Dependent Surveillance-Broadcast (ADS-B- Dependant cooperative Target).**

Global and Regional Requirements: Summary of AFI Surveillance Strategy



En route

	Separation (en-trail)	Short term (2008-2015)	Mid- term (2016-2020)	Long term (2020 and beyond)
Type 3	5nm	<u>Dual Coverage</u> SSR where implemented ADS-B where justified WAM where justified	<u>Dual Coverage</u> SSR where implemented ADS-B where justified WAM where justified	<u>Dual Coverage</u> Reduced number of SSRs ADS-B WAM where justified
Type 2	30nm x 30nm	ADS-C SSR where implemented ADS-B where justified WAM where justified	SSR where implemented ADS-B where justified WAM where justified	Reduced number of SSRs ADS-B WAM
Type 1	10 minutes	ADS-C Voice Reporting where justified	ADS-C Voice Reporting where justified	ADS-C Reduced number of Voice Reporting
Remote	10 minutes	ADS-C Voice Reporting where justified	ADS-C Voice Reporting where justified	ADS-C Reduced number of Voice Reporting
Oceanic	30nm x 30nm	ADS-C Voice Reporting	ADS-C Voice Reporting	ADS-C Voice Reporting

Global and Regional Requirements: Summary of AFI Surveillance Strategy



Approach

	Separation (en-trail)	Short term (2008-2015)	Mid- term (2016-2020)	Long term (2020 and beyond)
Type 3	TBD	SSR where implemented PSR where justified WAM (trials) ADS-B (Trials)	SSR where implemented PSR where justified WAM (gradually) ADS-B (gradually)	WAM (supplemental) ADS-B (primarily)
Type 2	TBD	SSR where implemented PSR where justified WAM (trials) ADS-B (Trials)	SSR where implemented PSR where justified WAM (gradually) ADS-B (gradually)	WAM (supplemental) ADS-B (primarily)

- Type 1: Complex traffic pattern and a high density traffic;
- Type 2: Complex traffic pattern and a medium density traffic; and
- Type 3: Low density traffic.

Global and Regional Requirements: Summary of AFI Surveillance Strategy



Terminal Air Space

	Separation (en-trail)	Short term (2008-2015)	Mid- term (2016-2020)	Long term (2020 and beyond)
Type 3	TBD	SSR where implemented PSR where justified WAM (trials) ADS-B (Trials)	SSR where implemented PSR where justified WAM (gradually) ADS-B (gradually)	WAM (supplemental) ADS-B (primarily)
Type 2	TBD	SSR where implemented PSR where justified WAM (trials) ADS-B (Trials)	SSR where implemented PSR where justified WAM (gradually) ADS-B (gradually)	WAM (supplemental) ADS-B (primarily)
Type 1	Procedural	Voice Reporting	Voice Reporting	Voice Reporting

Global and Regional Requirements: SAT and Related Meetings (FIT, CNMC)



- **Although informal, SAT reached tangible achievements (RVSM, AORRA..)**
- **ATS Performance Improvement Based Approach through Collaborative Monitoring of the ATM system (SATMA)**
- **Collaborative and Shared Decision Making in Planning and implementing of ATM Systems (CAFSAT Network, ADS-C/CPDLC)**

Global and Regional Requirements: SAT and Related Meetings (FIT, CNMC)



- **SAT 14-16 Meetings Addressed ADS-C/CPDLC;**
- **SAT Fans Interoperability Team (SAT/FIT) specialized in coordinating ADS-C/CPDLC:**
 - ✓ **Implementation;**
 - ✓ **Operation;**
 - ✓ **Monitoring.**
- **SAT/FIT Encourages assistance among SAT members**

Global and Regional Requirements: Decision SAT/FIT 7/1: ADS/CPDLC implementation status in SAT Area



That:

- ✓ **SAT/FIT members continue to update the SAT ADS-C/CPDLC implementation and interoperability status table.**
- ✓ **South Africa and Ghana who have already successfully implemented ADS/CPDLC, endeavour to support Angola ADS/CPDLC project through a coordination mission and in conjunction with ICAO Regional Offices (WACAF/ESAF)**

Conventional Radio Detection and Ranging (Radar)

- Extended coverage range
- Sensors Data exchange

VSAT Networks

- Satellite Based Remote stations
- Satellite network for data exchange and sharing

Dependent surveillance

- Automatic Dependent Surveillance on contract (ADS-C)
- Automatic Dependent Surveillance Broadcast (ADS-B)
- Satellite to carry the exchanged data between aircraft and Air traffic controller
- Satellite to ensure centre to centre data exchange
- Extended ADS-B by VSAT Networks

Currently: Good pace of implementation of SSRs, ADS-C/CPDLC

- ➔ **Lack of harmonization of implementation plans and projects**
- ➔ **Lack of interconnectivity and data sharing**
- ➔ **Challenge: How to insure seamless surveillance function along A-R?**
- ➔ **Awaited requirements from ATM: Separation minima criteria along A-R**

The way Forward



- **To consider the current and predicable hurdles encountered in COM NAV and SUR systems;**
- **To adopt the mitigating procedures successfully experienced on Missing FPL, OPMETs;**
- **To consider 12th AN-Conf outcome for a clearer definition of the requirements awaited for the implementation of each CNS related Blocks Modules;**
- **To consider ATM provision within (along) AFI A-R as the best way to ensure seamless ATM service provision;**
- **To promote Systems interconnectivity /interoperability**

Summary

- **We needed a vision: the operational concept**
- **We needed implementation framework: GANP, AFI ANP;**
- **Local systems implementation is going towards their operation maturity;**
- **CNS infrastructure is available even though to be improved;**
- **Initiatives to be taken**

ICAO

Uniting Aviation on

Safety | Security | Environment

